

An International Survey of Maintenance Human Factors Programs in Maintenance Organizations

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The purpose of this study is to assess what airline companies have done, are doing or are planning to do regarding the human factors maintenance elements of 14 CFR Part 145. International data will provide an opportunity to determine if voluntary versus regulatory approaches to the development of human factors programs for maintenance organizations has resulted in different practices. While covering a number of areas, questions are focused around training, error management, fatigue management, and additional human factors metrics. Additionally, respondents will be asked to describe their organization's support of their human factors program. A small survey of US maintenance organizations was conducted in 2002 as part of the Commercial Airplane Certification Process Study for Human Factors. This new proposed survey will provide an international comparison of the state of human factors in industry with the more limited national results found in 2002. This survey will help the FAA identify areas of concern and develop strategies, methods, and technologies to reduce airline accidents involving maintenance human factors.

INTRODUCTION

Commercial carriers have invested a great deal of financial and corporate resources in an attempt to address human factors both on the flight deck and within maintenance. It has been reported that U.S. airlines invest more than \$10 billion annually to keep their aircraft running smoothly (Boeing 2005). Wells (2001) reported that maintenance is a factor in nearly 50% of accidents. Maintenance-related errors have been associated with up to 15% of aircraft accidents worldwide (Murray, 1998). Human error has been documented as a causal factor within maintenance-related accidents (Boquet, Detwiler, Holcomb, Hackworth, Shappell, & Weigmann, 2005; Johnson & Watson, 2001).

Objective two of the FAA's 2005-2008 Strategic Plan (Flight Plan) Increased Safety Goal intends "to reduce the commercial airline fatal accident rate." One action being taken by the FAA's Aerospace Human Factors Research Division to meet this objective is an international survey of airlines focused on how they are currently implementing human factors initiatives into their maintenance operations. There are a variety of International approaches to the regulation of human factors programs for maintenance organizations. Transport Canada and the European Aviation Safety Agency have established specific, yet differing, rules regarding maintenance human factors. These rules pertain to such items as initial and continuation training and to requirements for formal error reporting systems. The FAA has not yet estab-

lished regulations but, instead, has created guidance documents and established voluntary reporting programs for maintenance organizations. The FAA has opted for a voluntary rather than a regulatory approach to maintenance human factors.

This research project centers on an assessment of the impact of voluntary versus regulatory approaches to maintenance human factors programs. What is the organizational impact, the impact to the aviation maintenance technician (AMT) (also called Licensed Engineer, in Europe or Aviation Maintenance Engineer in Canada)? What is the impact on maintenance-related incidents and accidents? Additionally, is there a significant difference in the implementation of maintenance human factors programs across the international spectrum?

The goal of this effort is to identify areas of concern so that the FAA may affect corrections in FAA policy, guidance material, and FAA-sponsored programs in order to improve the overall quality of airline maintenance.

METHODS

Employees at several international airline maintenance organizations will receive an electronic invitation to respond to the survey. With coordination from the European Aviation Safety Agency, several airlines, and FAA representatives, potential respondents will be identified. Publications including newsletters and notices will be sent to encourage employee participation. The respondents will be employed within the maintenance firms as engineers, quality assurance specialists, maintenance directors, and mechanics.

All participants will receive an e-mail invitation to complete the online survey. The e-mail will include an explanation of the survey as well as a link to the survey and username/password information. The respondent can then click the link and login to the survey. Once the participant completes the survey, the data will be stored in a database.

Airline Maintenance Survey

The survey has approximately 60 items that address human factors practices, human factors training, human error management and documentation, and issues related to quality assurance within airline maintenance. There are also several open-ended questions that ask respondents to comment on their company's human factors practices, error management, and human factors interventions aimed at reducing human error.

RESULTS

An initial draft of the online questionnaire has been developed, using input from FAA personnel as well as national and international industry representatives. With the assistance of Dr. Bill Johnson, we have compiled a fairly extensive address list of international representatives. An electronic version of the questionnaire was administered to approximately 30 representatives from Europe, Asia, South America, and the U.S. for review and comment. Feedback will be used to make final adjustments to the instrument prior to submission to OMB. The Federal Registry announcement was submitted and the mandatory period of review has passed. Dr. Hackworth will be attending the

JAA/EASA in October 2005 to discuss the survey's progress.

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